

## **High Density Polyethylene (HDPE) Water Tight Smooth-Lined Thermoplastic Pipe:**

1. Description – This item shall govern for the furnishing and installing of all High Density Corrugated Polyethylene (HDPE) Smooth Lined Pipe and / or materials for constructing of culverts, side road pipes, storm sewers, stubs, and all related connections and fittings, all of which shall conform to ASTM F 2306, latest edition.
2. Materials - Unless otherwise specified on the plans or herein, thermoplastic pipe and joint fittings shall conform to the following:
  - a. High Density Polyethylene (HDPE) Smooth Lined Pipe & Fittings shall be manufactured in accordance with requirements of ASTM F 2306, latest edition. Type S: This pipe shall have a full circular cross section, with an outer corrugated pipe wall and a smooth inner wall per AASHTO M294-07, section 4.1.2.
  - b. High Density Polyethylene (HDPE) Smooth Lined Pipe shall be manufactured from virgin PE compounds which conform with the requirements of cell class 335400C as defined and described in ASTM D 3350.
  - c. Minimum Pipe Stiffness (PS) at five percent deflection shall be as described in ASTM F 2306, Section 6.3 when tested in accordance with ASTM D 2412.
  - d. All HDPE pipe shall be third party certified by either the Plastic Pipe Institute (PPI) or the National Transportation Product Evaluation Program (NTPEP).
3. Installation – Installation shall be in accordance with ASTM D 2321, “Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications”.
  - a. General Installation Requirements - Thermoplastic pipe shall be unloaded and handled with reasonable care.
  - b. Bedding and Backfill – Backfill in the trench zone shall meet the requirements of AASHTO M145 A-1-a to A-2-7 and be a 2” maximum granular material. Stable and uniform bedding shall be provided for the pipe. The middle of the bedding equal to  $1/3^{\text{rd}}$  of the pipe O.D. may be loosely placed, while the remainder shall be compacted to a minimum 96% of maximum density (Modified Proctor). A minimum of 4” of  $3/4$  minus grave shall be provided prior to placement of the pipe, unless an

unyielding material (rock cuts) is present in the trench bottom, then a 6" cushion of bedding is recommended. Bedding shall be placed in layers 8" loose lift thickness and brought up evenly and simultaneously on both sides of the pipe to an elevation not less than one foot (1') above the top of the pipe. Backfill must be worked into the haunch area and compacted by hand. Backfill shall be compacted to a minimum compaction level of 96% Density (Modified Proctor).

- c. Trench Widths - Trench width shall be in accordance with ASTM D2321 and shall be sufficient to ensure working room to properly and safely place and compact haunching and other backfill materials. Minimum trench width shall not be less than 1.25 times the pipe outside diameter plus 12 inches. ( $1.25 \times \text{O.D.} + 12''$ )
- d. Minimum Cover - The minimum cover is one foot (1.0') for HS-25 Live Loads (18"-48" Diameters) and two feet (2.0') for larger diameter structures (60" Diameter); however, care should be taken when heavy construction equipment loads cross the pipe trench during construction. If the passage of construction equipment over an installed pipeline is necessary during project construction, compacted fill in the form of a ramp shall be constructed to a minimum elevation of one extra foot of cover in addition to the above minimum cover over the top of the pipe. Any damaged pipe shall be replaced at the contractor's expense.
- e. Joints - Joints shall be installed that the connection of pipe sections will form a continuous line free from irregularities in the flow line. Joints shall meet the following:
  - i. Watertight joints must meet a 74kPa (10.8 psi) laboratory test per ASTM D3212 and utilize a bell and spigot design with a gasket meeting ASTM F477.
  - ii. Do not exceed a deflection angle of 1 degree.
- f. HDPE line shall be TV'ed by the contractors hired firm after placement and compaction of road base and prior to placing asphalt. This TV'ed disk shall be reviewed by the City designated Inspector. All areas found defective shall be repair to the satisfaction of the City Inspector before placing asphalt.
- g. Storm drain caution tape shall be place and centered 1' above the pipe.
- h. HDPE and RCP lines will be TV'ed again, by City personnel prior to final bond release. All lines shall be cleaned by Developer prior to City performing the work. Any damaged pipe sections shall be repaired or replaced prior to final bond release.